

What is claimed is:

1. A method for performing a service on a network device, comprising the steps of:

installing the service on the network device from another location, the service

5 having a corresponding set of service relationships;

checking the service relationships of the loaded service against a stored registry of  
relationships; and

causing the service to be executed on the network device if the service  
relationships can be resolved.

2. A method according to claim 1, further comprising the step of:

updating the stored registry of relationships with information corresponding to the  
executed service.

15 3. A method according to claim 1, wherein the step of causing the service to be executed  
includes the step of providing instructions corresponding to the service to a virtual machine that  
is ported to the network device.

4. A method according to claim 1, further comprising the step of:

20 causing another service to be executed on the network device in accordance with  
a result of the step of checking the service relationships.

5. A method according to claim 1, wherein the network device is one of a router, a switch, and a hub.

6. A method according to claim 1, wherein the network device comprises a packet  
5 switching fabric.

7. A method according to claim 6, wherein the network device comprises a control plane and a forwarding plane including the packet switching fabric, the loading, checking and causing steps being performed in the control plane without interruption of the forwarding plane.

8. A method according to claim 1, further comprising the step of:  
communicating with a remote client to receive an identifier corresponding to the  
service to be performed.

15 9. A method according to claim 1, wherein the another location corresponds to an application server that stores a plurality of services.

10. A method according to claim 8, wherein the another location corresponds to an application server that stores a plurality of services, and wherein the identifier comprises a URL  
20 pointing to the application server.

11. A method according to claim 10, wherein the step of installing includes the step of downloading a file corresponding to the service from the application server in accordance with the URL.

5 12. A method according to claim 11, wherein the step of downloading includes the step of communicating with the application server using the HTTP protocol.

13. A method according to claim 8, wherein the step of communicating includes the step of providing a telnet interface that allows the remote client to provide the identifier in association with a predefined command requesting the service to be performed.

14. A method according to claim 1, further comprising the step of interfacing with embedded hardware and software to perform tasks associated with the service.

15 15. A method according to claim 5, wherein the service comprises accessing a MIB on the network device.

16. A method according to claim 6, wherein the service comprises accessing a MIB on the network device.

20

17. A method according to claim 7, further comprising the step of interfacing with embedded hardware and software to cause forwarding rules referred to by the packet switching fabric to be adjusted.

5

18. A network device for locally performing a service, comprises:

means for installing the service on the network device from another location, the service having a corresponding set of service relationships;

means for checking the service relationships of the loaded service against a stored registry of relationships; and

means for causing the service to be executed on the network device if the service relationships can be resolved.

19. A network device according to claim 18, further comprising:

means for updating the stored registry of relationships with information corresponding to the executed service.

15

20. A network device according to claim 18, wherein the means for causing the service to be executed includes means for providing instructions corresponding to the service to a virtual machine that is ported to the network device.

20

21. A network device according to claim 18, further comprising:

means for causing another service to be executed on the network device in accordance with a result from the means for checking the service relationships.

22. A network device according to claim 18, wherein the network device is one of a  
5 router, a switch, and a hub.

23. A network device according to claim 18, wherein the network device comprises a  
packet switching fabric.

24. A network device according to claim 23, wherein the network device comprises a  
control plane and a forwarding plane including the packet switching fabric, the means for  
loading, means for checking and means for causing being operable in the control plane without  
interruption of the forwarding plane.

25. A network device according to claim 18, further comprising:  
means for communicating with a remote client to receive an identifier  
corresponding to the service to be performed.

26. A network device according to claim 18, wherein the another location corresponds to  
20 an application server that stores a plurality of services.

27. A network device according to claim 25, wherein the another location corresponds to an application server that stores a plurality of services, and wherein the identifier comprises a URL pointing to the application server.

5        28. A network device according to claim 27, wherein the means for installing includes means for downloading a file corresponding to the service from the application server in accordance with the URL.

29. A network device according to claim 28, wherein the mean for downloading includes means for communicating with the application server using the HTTP protocol.

30. A network device according to claim 25, wherein the means for communicating includes means for providing a telnet interface that allows the remote client to provide the identifier in association with a predefined command requesting the service to be performed.

15

31. A network device according to claim 18, further comprising means for interfacing with native hardware and software to perform tasks associated with the service.

32. A network device according to claim 22, wherein the service comprises accessing a  
20 MIB on the network device.

33. A network device according to claim 23, wherein the service comprises accessing a MIB on the network device.

34. A network device according to claim 24, further comprising means for interfacing  
5 with native hardware and software to cause forwarding rules referred to by the packet switching fabric to be adjusted.

35. A network device for locally performing a service, comprising:  
a network interface adapted to install the service on the network device from  
another location, the service having a corresponding set of service relationships;  
a registry of service relationships;  
a service manager coupled to the network interface and the registry that is adapted  
to check the service relationships of the loaded service against the registry; and  
a service launcher coupled to the service manager that is adapted to cause the  
15 service to be executed on the network device if the service relationships can be resolved.

36. A network device according to claim 35, wherein the network device is one of a router, a switch, and a hub.

20 37. A network device according to claim 35, further comprising a packet switching fabric.

38. A network device according to claim 37, further comprising:

a control plane including the network interface, the registry, the service manager and the service launcher; and

a forwarding plane including the packet switching fabric, the network interface, the service manager and the service launcher being operable in the control plane without interruption of the forwarding plane.

39. A network device according to claim 35, wherein the network interface is further adapted to communicate with a remote client to receive an identifier corresponding to the service to be performed.

40. A network device according to claim 39, wherein the network interface includes a telnet interface that allows the remote client to provide the identifier in association with a predefined command requesting the service to be performed.

41. A network device according to claim 35, further comprising API extensions through which the service interfaces with native hardware and software to perform tasks associated with the service.



42. A network device according to claim 38, further comprising API extensions through which the service interfaces with native hardware and software to cause forwarding rules referred to by the packet switching fabric to be adjusted.

5 43. A network device for locally performing a service, comprising:

a control plane including:

an embedded CPU and operating system,

a service environment ported to the embedded CPU and operating system,

the service environment having:

a network interface adapted to install the service on the network device from another location, the service having a corresponding set of service relationships,

a registry of service relationships,

a service manager coupled to the network interface and the registry that is adapted to check the service relationships of the loaded service against the registry, and

a service launcher coupled to the service manager that is adapted to cause the service to be executed on the network device if the service relationships can be resolved, and

15 20 a forwarding plane including a packet switching fabric, the service environment being operable in the control plane without interruption of the forwarding plane.

44. A method for updating one of a plurality of functionalities of a network device,  
comprising the steps of:

providing a service environment that executes in a runtime environment of the  
network device;

5 providing code corresponding to the updated one of the functionalities to the  
service environment from another location on a network coupled to the network device;

providing header information indicating relationships required by the updated one  
of the functionalities to the service environment; and

executing the code corresponding to the updated one of the functionalities if the  
required relationships can be resolved by the service environment.

60184338V3